

C2 1. (Amended) A composition comprising a substantially purified thermostable AviIII peptide, said AviIII peptide comprising a catalytic domain of a glycosyl hydrolase family 74 enzyme and a carbohydrate binding domain (CBD) III.

2. The composition of claim 1 wherein the thermostable AviIII peptide is further defined as comprising a linker and a signal sequence.

C3 3. (Amended) The composition of claim 1 or 2 wherein the glycosyl hydrolase family 74 enzyme catalytic domain of the thermostable AviIII peptide is further defined as having a length of about 730 to about 760 amino acids.

4. (Amended) The composition of claim 1, 2, or 3 wherein the carbohydrate binding domain (CBD) III of the thermostable AviIII peptide is further defined as comprising a length of about 80 to about 150 amino acids.

C4 5. (Amended) The composition of claim 1, 2, or 3 wherein the carbohydrate binding domain (CBD) III of the thermostable AviIII peptide is further defined as comprising a length of about 90 amino acids.

6. (Amended) The composition of claim 3 wherein the glycosyl hydrolase family 74 enzyme catalytic domain is further defined as a polypeptide sequence of SEQ ID NO: 3.

C5 7. (Amended) The composition of claim 3 wherein the carbohydrate binding domain (CBD) III is further defined as a polypeptide sequence of SEQ ID NO: 4.

8. (Amended) The composition of claim 3 wherein the carbohydrate-binding domain (CBD) III is further defined as comprising the polypeptide sequence of SEQ ID NO: 5.

9. (Amended) The composition of claim 1 wherein said AviIII protein comprises the polypeptides represented by SEQ ID NO: 3 and SEQ ID NO: 4.

10. (Amended) The composition of claim 1 wherein said AviIII protein is encoded by a nucleic acid sequence having at least about 70% sequence identity to the polynucleotide sequence of SEQ ID NO: 2.

C5 11. (Amended) The composition of claim 1 wherein said AviIII protein is encoded by a nucleic acid sequence having at least about 80% sequence identity to the polynucleotide sequence of SEQ ID NO: 2.

12. (Amended) An isolated thermostable AviIII peptide having a polypeptide sequence of SEQ ID NO: 1.

13. (Amended) The isolated thermostable AviIII peptide of claim 12 encoded by the polynucleotide sequence of SEQ ID NO: 2.

14. An industrial mixture suitable for degrading cellulose, such mixture comprising the thermostable AviIII polypeptide of claim 1.

C6 15. The industrial mixture of claim 14 further defined as comprising a detergent.

28. (Amended) An isolated polypeptide molecule comprising:

a) a polypeptide sequence of SEQ ID NO: 3;

b) a polypeptide sequence of SEQ ID NO: 4;

C7 c) a polypeptide sequence of SEQ ID NO: 5;

d) a polypeptide sequence of SEQ ID NO: 1;

e) a polypeptide sequence of SEQ ID NO: 3; SEQ ID NO:4; and SEQ ID NO: 5;

or

f) a sequence having at least about 70% sequence identity with the polypeptide sequence of a), b), c), d), or e).

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29. (Amended) The polypeptide molecule of claim 28, having at least about 90% sequence identity with the polypeptide sequence of a), b), c), d), e), or f).

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30. A fusion protein comprising the polypeptide of claim 28 and a heterologous peptide.

31. The fusion protein of claim 30, wherein the heterologous peptide is a substrate targeting moiety.

32. The fusion protein of claim 30, wherein the heterologous peptide is a peptide tag.

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33. (Amended) The fusion protein of claim 32, wherein the peptide tag is 6-His, thioredoxin, hemagglutinin, glutathione S-transferase, or OmpA signal sequence tag.

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34. The fusion protein of claim 30, wherein the heterologous peptide is an agent that promotes polypeptide oligomerization.

35. The fusion protein of claim 34, wherein the agent is a leucine zipper.

36. A cellulase-substrate complex comprising the isolated polypeptide molecule of claim 28 bound to cellulose.